

# McGraw-Hill DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS

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## Fourth Edition

**Sybil P. Parker**

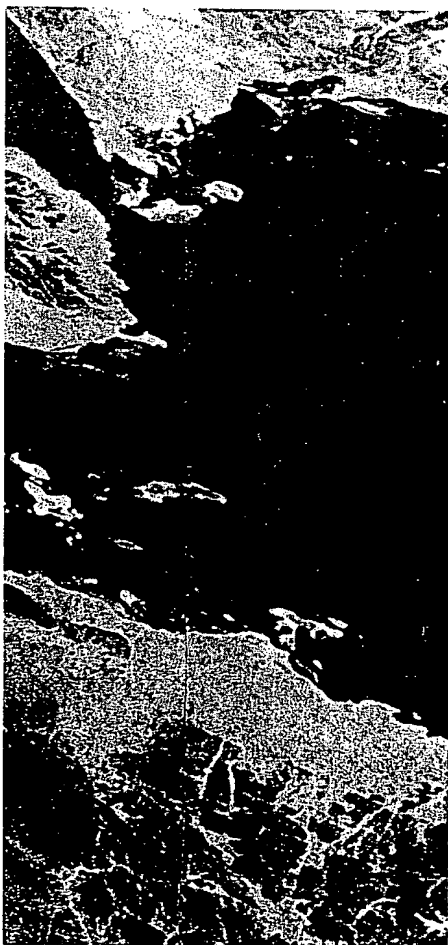
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On the cover: Pattern produced from white light by a computer-generated diffraction plate containing 529 square apertures arranged in a 23 × 23 array. (R. B. Hoover, Marshall Space Flight Center)

On the title pages: Aerial photograph of the Sinai Peninsula made by Gemini spacecraft. (NASA)

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## McGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS, Fourth Edition

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popliteal fascia, and tibia, and insertion is the calcaneus; plantar-flexes the foot. { 'sɒ-lē-əs }

**solfatara** [GEOL] A fumarole from which sulfurous gases are emitted. { 'sɒl-fə'tārə }

**sol-gel glass** [PHYS CHEM] An optically transparent amorphous silica or silicate material produced by forming interconnections in a network of colloidal, submicrometer particles under increasing viscosity until the network becomes completely rigid, with about one-half the density of glass. { 'sɒl 'jel 'glas }

**solid** [PHYS] 1. A substance that has a definite volume and shape and resists forces that tend to alter its volume or shape. 2. A crystalline material, that is, one in which the constituent atoms are arranged in a three-dimensional lattice, periodic in three independent directions. { 'sɒl-əd }

**solid angle** [MATH] A surface formed by all rays joining a point to a closed curve. { 'sɒl-əd 'æŋɡəl }

**solid asphalt** [MATER] Asphalt with a penetration number of less than 10 under specified test conditions. { 'sɒl-əd 'as,fɒlt }

**solid box** [MECH ENG] A solid, unadjustable ring bearing lined with babbitt metal, used on light machinery. { 'sɒl-əd 'bæks }

**solid car** [MIN ENG] A mine car equipped with a swivel coupling and generally used with a rotary dump. { 'sɒl-əd 'kɑr }

**solid coupling** [MECH ENG] A flanged-face or a compression-type coupling used to connect two shafts to make a permanent joint and usually designed to be capable of transmitting the full load capacity of the shaft; a solid coupling has no flexibility. { 'sɒl-əd 'kʌp-lɪŋ }

**solid crib timbering** [MIN ENG] Shaft timbering with cribs laid solidly upon one another. { 'sɒl-əd 'krɪb 'tɪm-bərɪŋ }

**solid cutter** [DES ENG] A cutter made of a single piece of material. { 'sɒl-əd 'kʌd-ər }

**solid die** [DES ENG] A one-piece screw-cutting tool with internal threads. { 'sɒl-əd 'di }

**solid-dielectric capacitor** [ELEC] A capacitor whose dielectric is one of several solid materials such as ceramic, mica, glass, plastic film, or paper. { 'sɒl-əd 'dɪ-ə'lek-trɪk kə'pəs-əd-ər }

**solid drilling** [ENG] In diamond drilling, using a bit that grinds the whole face, without preserving a core for sampling. { 'sɒl-əd 'drɪl-ɪŋ }

**solid-electrolyte battery** [ELEC] A primary battery whose electrolyte is either a solid crystalline salt, such as silver iodide or lead chloride, or an ion-exchange membrane; in either case, conductivity is almost entirely ionic. { 'sɒl-əd i'lek-trə,lɪt 'bæd-ər-ē }

**solid-electrolyte fuel cell** [ELEC] Self-contained fuel cell in which oxygen is the oxidant and hydrogen is the fuel; the oxidant and fuel are kept separated by a solid electrolyte which has a crystalline structure and a low conductivity. { 'sɒl-əd i'lek-trə,lɪt 'fjuəl,sel }

**solid electrolytic capacitor** [ELEC] An electrolytic capacitor in which the dielectric is an anodized coating on one electrode, with a solid semiconductor material filling the rest of the space between the electrodes. { 'sɒl-əd i'lek-trə,lɪd-ɪk kə'pəs-əd-ər }

**solid explosive** [MATER] An explosive employed in the form of a powder, a light-running granulated mass, or as solid sticks. { 'sɒl-əd ɪk'splɒ-sɪv }

**solid helium** [CRYO] A certain state which is not attained by helium under its own vapor pressure down to absolute zero, but which requires an external pressure of 25 atmospheres at absolute zero. { 'sɒl-əd 'hɛ-lɪ-əm }

**solidification** [PHYS] The change of a fluid (liquid or gas) into the solid state. { sɒl-əd-fə'kæ-shən }

**solidification shrinkage** [MET] Volume contraction of a metal during solidification. { sɒl-əd-fə'kæ-shən, 'shrɪŋ'kɪŋ }

**solidified petroleum** See jellied petroleum. { sɒl-əd,fɪd 'pɛ-trɒ-lē-əm }

**solid injection system** [MECH ENG] A fuel injection system for a diesel engine in which a pump forces fuel through a fuel line and an atomizing nozzle into the combustion chamber. { 'sɒl-əd ɪn'jek-shən, 'sɪs-təm }

**solid insulator** [ELEC] An electric insulator made of a solid substance, such as sulfur, polystyrene, rubber, or porcelain. { 'sɒl-əd ɪn'sə,ləd-ər }

**solid laser** [OPTICS] A laser in which either a crystalline or amorphous solid material, usually in the form of a rod, is excited by optical pumping; the most common crystalline materials are ruby, neodymium-doped ruby, and neodymium-doped yttrium aluminum garnet. { 'sɒl-əd 'lā-zər }

**solid-liquid equilibrium** [PHYS CHEM] 1. The interrelation of a solid material and its melt at constant vapor pressure. 2. The concentration relationship of a solid with a solvent liquid other than its melt. Also known as liquid-solid equilibrium. { 'sɒl-əd 'lɪk-wəd, 'ē-kwə'lib-rē-əm }

**solid logic technology** [ELECTR] A method of computer construction that makes use of miniaturized modules, resulting in faster circuitry because of the reduced distances that current must travel. { 'sɒl-əd 'lɔːdʒ-ɪk tek'nɒl-ə-dʒi }

**solid moment of inertia** [PHYS] The integral of the products of the mass of each of the infinitesimal elements of the solid with the square of their distance from a given axis. { 'sɒl-əd 'mɒ-mənt əv ɪ'nɜːr-shə }

**solid-phase welding** [MET] A welding method in which the weld is consummated by pressure or by heat and pressure without fusion. { 'sɒl-əd 'fæz 'weld-ɪŋ }

**solid-piled** [MATER] Pertaining to plywood which is fresh from clamps or a hot press, and which is piled onto a solid flat base without stickers and weighted down until it reaches its normal temperature and moisture content. Also known as bulked-down; dead-piled. { 'sɒl-əd 'pɪld }

**solid propellant** [MATER] A rocket propellant in solid form, usually containing both fuel and oxidizer combined or mixed, and formed into a monolithic (not powdered or granulated) grain. Also known as solid rocket fuel; solid rocket propellant. { 'sɒl-əd prə'pel-ənt }

**solid propellant binder** [MATER] The ingredient component of a propellant that is the agent for holding all the other ingredients together; contributes most to the physical or mechanical properties of the grain. { 'sɒl-əd prə'pel-ənt 'bɪn-dər }

**solid-propellant rocket engine** [AERO ENG] A rocket engine fueled with a solid propellant; such motors consist essentially of a combustion chamber containing the propellant, and a nozzle for the exhaust jet. { 'sɒl-əd prə'pel-ənt 'ræk-ət, 'en-dʒən }

**solid rocket** [AERO ENG] A rocket that is propelled by a solid-propellant rocket engine. { 'sɒl-əd 'ræk-ət }

**solid rocket fuel** See solid propellant. { 'sɒl-əd 'ræk-ət, 'fjuəl }

**solid rocket propellant** See solid propellant. { 'sɒl-əd 'ræk-ət prə'pel-ənt }

**solid Schmidt telescope** [OPTICS] A type of Schmidt system which is constructed from a single block of glass, designed to operate at very small aperture ratios. { 'sɒl-əd 'shɪt 'tel-ə'skɒp }

**solid shafting** [MECH ENG] A solid round bar that supports a roller and wheel of a machine. { 'sɒl-əd 'shaft-ɪŋ }

**solid shank tool** [ENG] A cutting tool in which the shank and cutting edges are machined from one piece. { 'sɒl-əd 'ʃæŋk 'tʊl }

**solid solution** [PHYS] A homogeneous crystalline phase composed of several distinct chemical species, occupying the lattice points at random and existing in a range of concentrations. { 'sɒl-əd sɒ'lju-shən }

**solid state** [ENG] Pertaining to a circuit, device, or system that depends on some combination of electrical, magnetic, and optical phenomena within a solid that is usually a crystalline semiconductor material. [PHYS] The condition of a substance in which it is a solid. { 'sɒl-əd 'stæt }

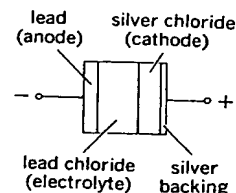
**solid-state amorphizing reaction** [MET] An interdiffusion reaction that takes place at constant temperature over long periods of time at a clean, oxide-free boundary between two crystalline metals that have a large chemical affinity, and results in the formation of an amorphous alloy of the two metals (a metallic glass). { 'sɒl-əd 'stæt ə'mɔːr,fɪz-ɪŋ rē'ak-shən }

**solid-state battery** [ELEC] A battery in which both the electrodes and the electrolyte are solid-state materials. { 'sɒl-əd 'stæt 'bæd-ər-ē }

**solid-state circuit** [ELECTR] Complete circuit formed from a single block of semiconductor material. { 'sɒl-əd 'stæt 'sɜːk-ət }

**solid-state circuit breaker** [ELECTR] A circuit breaker in which a Zener diode, silicon controlled rectifier, or solid-state device is connected to sense when load terminal voltage exceeds a safe value. { 'sɒl-əd 'stæt 'sɜːk-ət, 'bræk-ər }

#### SOLID-ELECTROLYTE BATTERY



Schematic diagram of typical solid-electrolyte cell with solid crystalline salt electrolyte.